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Jens Franz

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EXAMINER

SHANSKE, JASON D

ART UNIT

PAPER NUMBER

3748

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,237	Applicant(s) FRANZ ET AL.	
	Examiner JASON SHANSKE	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/26/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/26/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Applicant has failed to provide a description of Figs. 3 and 4 in the Brief Description of the Drawings.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 8-10, 13 and 14 are rejected under 35 U.S.C. 102(a) as being anticipated by Hahn (European Patent No. EP 1209332).

Regarding claim 8, Hahn is drawn to a method for regenerating a nitrogen oxide storage catalytic converter arranged in the exhaust pipe of an internal combustion engine. Hahn discloses in a first regeneration mode, setting a constant value for an air/fuel ratio ($\lambda F1$, Figure 4) when nitrogen oxide concentration in exhaust gas on an output side of the converter exceeds a predeterminable triggering threshold value, which triggers a regeneration of the nitrogen oxide storage catalytic converter (Figure 1; paragraphs 0007 and 0025). Hahn also discloses after the first regeneration mode implementing a second regeneration mode in which a variable value is provided for the

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air/fuel ratio ($\lambda F2-\lambda F4$, Figure 4), such that the time rate of change of the air/fuel ratio is set as a function of one of i) mass flow of the exhaust gas flowing through the storage catalytic converter, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas (paragraphs 0024-0027 and 0029).

Regarding claim 9, Hahn further discloses ending the first regeneration mode after a predeterminable first period of time (Figure 4, paragraph 0029).

Regarding claim 10, Hahn further discloses ending the second regeneration mode after a predeterminable second period of time (Figure 4, paragraphs 0029-0031).

Regarding claim 13, Hahn further discloses setting of the air/fuel ratio is limited to a value range with a predeterminable lower value and a predeterminable upper limit value (paragraphs 0028 and 0031).

Regarding claim 14, the Examiner notes the use of the phrase "and/or" by the Applicant. For examination purposes, "and/or" is treated as "or" under the broadest reasonable interpretation of the claim. As noted above, Hahn discloses a predeterminable triggering threshold value, which triggers a regeneration of the nitrogen oxide storage catalytic converter (Figure 1; paragraphs 0007 and 0025).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hahn as applied to claim 8 above.

Regarding claim 11, Hahn discloses multiple regeneration modes (Figure 4 and paragraphs 0028-0030). As noted above, Hahn discloses a regeneration mode in which a variable value is provided for the air/fuel ratio ($\lambda F2$ - $\lambda F4$, Figure 4), such that the time rate of change of the air/fuel ratio is set as a function of one of i) mass flow of the exhaust gas flowing through the storage catalytic converter, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas (paragraphs 0024-0027 and 0029). Hahn further discloses that oxygen sensitive measuring means 20 may be disposed in the exhaust pipe 14 on the output side of a nitrogen oxide storage converter 18. The oxygen sensitive measuring means 20 may be a NO_x sensor which includes a lambda measuring function. (Figure 1; paragraphs 0021 and 0024). Hahn further discloses that the time rate of change of the air/fuel ratio may be set as a function of a measured value of the lambda measuring function of the NO_x sensor 20. (paragraph 24).

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Hahn discloses the claimed invention except for a third regeneration mode, setting the time rate of change of the air/fuel ratio as a function of one of i) the mass flow of the exhaust gas, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas, **and also as** a function of a measured value from a lambda probe arranged in the exhaust pipe on the output side of the nitrogen oxide storage catalytic converter.

A person of ordinary skill in the art at the time the invention was made would have been motivated to modify Hahn to include a regeneration mode setting the time rate of change of the air/fuel ratio as a function of one of i) the mass flow of the exhaust gas, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas, **and also as** a function of a measured value from a lambda probe arranged in the exhaust pipe on the output side of the nitrogen oxide storage catalytic converter. This motivation occurs because Hahn discloses setting the time rate of change of the air/fuel ratio as a function of one of i) the mass flow of the exhaust gas, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas, or as a function of a measured value from a lambda probe arranged in the exhaust pipe on the output side of the nitrogen oxide storage catalytic converter to minimize fuel consumption while efficiently and completely regenerating the NO_x storage catalytic converter. Modifying Hahn to set the time rate of change of the air/fuel ratio as a function of one of i) the mass flow of the exhaust gas, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas, **and also as** a function of a measured value from a lambda probe arranged in the exhaust

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pipe on the output side of the nitrogen oxide storage catalytic converter would further enhance the minimization of fuel consumption while efficiently and completely regenerating the NOx storage catalytic converter, the stated purpose of Hahn. Further, this can easily be accomplished through the oxygen sensitive measuring means 20, which may include both a NOx sensor and a lambda measuring function.

7. Claims 8-10, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gunther (Great Britain Patent No. GB 2375059 B) in view of Voigtlaender (German Patent No. DE 19915793 A1).

Regarding claim 8, Gunther is drawn to a method for regenerating a nitrogen oxide storage catalytic converter arranged in the exhaust pipe of an internal combustion engine. Gunther discloses in a first regeneration mode, setting a constant value for an air/fuel ratio when nitrogen oxide concentration in exhaust gas on an output side of the converter exceeds a predeterminable triggering threshold value, which triggers a regeneration of the nitrogen oxide storage catalytic converter. Gunther also discloses after the first regeneration mode implementing a second regeneration mode. (See the Applicant's Admitted Prior Art in Paragraph 4 of the Applicant's application; see also Figures 2 and 3; page 7, line 5 – page 8, line 32; and page 11, lines 6-20 of Gunther). Gunther discloses the claimed invention except for a second regeneration mode in which a variable value is provided for the air/fuel ratio such that the time rate of change is set as a function of one of i) mass flow of the exhaust gas flowing through the storage

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catalytic converter, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas.

In the same field of endeavor, Voigtlaender discloses a method for performing desorption operational phases for a nitrogen oxide adsorber of an exhaust gas purification system. Voigtlaender discloses a second regeneration mode in which a variable value is provided for the air/fuel ratio such that the time rate of change is set as a function of one of i) mass flow of the exhaust gas flowing through the storage catalytic converter, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas. (Figures 2 - 4; Column 5, line 27 - Column 6, line 18; and Column 6, lines 37 - 61).

A person of ordinary skill in the art at the time the invention was made would have been motivated to modify the method of Gunther to include a variable value for the air/fuel ratio such that the time rate of change is set as a function of one of i) mass flow of the exhaust gas flowing through the storage catalytic converter, and ii) an internal combustion engine operating variable linked with the mass flow of the exhaust gas as taught by Voigtlaender because both Gunther and Voigtlaender are in the same field of endeavor and are directed to the same problem, regulating the air/fuel ratio to minimize fuel consumption while efficiently regenerating an NO_x storage catalytic converter.

Regarding claims 9 and 10, Voigtlaender further discloses ending the first regeneration mode after a predeterminable first period of time and the second regeneration mode after a predeterminable second period of time (Figures 2-4, Column 3, lines 3-16 and Column 6, lines 19-36).

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Regarding claim 13, Voigtlaender further discloses setting of the air/fuel ratio is limited to a value range with a predeterminable lower value and a predeterminable upper limit value (Figures 2 - 4; Column 4, lines 16 – 36).

Regarding claim 14, the Examiner notes the use of the phrase "and/or" by the Applicant. For examination purposes, "and/or" is treated as "or" under the broadest reasonable interpretation of the claim. As noted above, Gunther discloses a predeterminable triggering threshold value, which triggers a regeneration of the nitrogen oxide storage catalytic converter (See the Applicant's Admitted Prior Art in Paragraph 4 of the Applicant's application; see also page 8, lines 22-26 of Gunther).

Conclusion

8. Accordingly, claims 8-14 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Shanske whose telephone number is (571)270-5985. The examiner can normally be reached on Monday through Friday 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on 571-272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. S./
Examiner, Art Unit 3748

/Thomas E. Denion/
Supervisory Patent Examiner, Art Unit 3748